CHAPTER 11.
RECOMMENDED ACTIONS

11.1 RECOMMENDED ACTIONS

11.1.1 Project Selection

A list of 36 recommended actions including capital improvement projects (CIP), right-of-way acquisition, studies, and programs were developed from the recommendations on groundwater, geomorphology, water quality, stream habitat, nearshore habitat, and drainage presented in a Draft report. Detail project sheets were prepared for 18 early action projects in this draft report and are contained in Appendix A. The recommended Actions in the Draft report were than discussed in two workshop meetings with County staff and the consultant. Some of the proposed actions in the Draft report were modified, combined with other actions, and several new items were added. A total of 39 recommended actions including projects, studies, and programs are proposed in this report. The recommended actions are described in Table 11-1 and shown on Figure 11-1.

11.1.2 Project Ranking

The projects were than ranked by King County staff based on the criteria shown in Figure 11-2. The projects were ranked as high, medium, or low and divided into two lists. The ranking criteria consisted of 1) Ecological Significance which assessed what and how important is the identified ecological feature and processes, 2) Threat to Life, Limb, and Property which assessed the significance of the threat and its urgency, and 3) Project Efficacy which assesses what is the likely-hood of project success and implementation. Table 11-2 contains the projects that have sufficient information to make a recommendation. Twelve projects needed additional information before they could be ranked and are shown in Table 11-3. Ranking sheets were prepared for each of the projects including those projects in Table 11-3 and are attached at the end of this Chapter.

11.1.3 Cost Estimating

Detail project costs estimates were prepared for 18 early actions and those estimates are contained in Appendix A. The remainder of the action items were estimated by professional judgement as less than $75,000, $75,000-$250,000, and greater than $250,000 as shown in Table 11-1 and the individual ranking sheets.

11.2 ISLAND-WIDE RECOMMENDATIONS

From the recommendations presented in the earlier chapters of this report, the following list of non-capital projects with island-wide benefits was selected for recommendation:

- **Public Education**—King County has done a good job on public education. However, more work is needed to educate the residents on Vashon-Maury Island about how creeks and the nearshore habitat become impaired, what they can do to help improve stream and nearshore habitat, and what the County and others are doing to improve the conditions on Vashon-Maury Island. More work is also needed in this regard about groundwater and landslides issues.

- **Coordination with Other Agencies**— The needed improvements and protections to Vashon-Maury Island cannot be done by one agency or jurisdiction. It is recommended that a meeting be held with all involved agencies and jurisdictions to develop a comprehensive plan to start implementing the recommended capital improvement and island-wide projects. Some of the key agencies and groups are King County, the Washington Department of Fish and Wildlife, the Washington Department of Ecology, the Vashon-Maury Island Ground Water Advisory Committee, and water purveyors.
- **Updates to Characterization Report**— This report was an analysis of existing data. More fieldwork is needed to identify specific habitat needs island-wide for a more comprehensive characterization of island conditions. Also further data gathering, monitoring and calibration are recommended for the hydrology. Future reconnaissance report update can use the Pacific Northwest Center for Geologic Mapping Studies at the Department of Earth and Space Sciences, University of Washington's Vashon Island geologic map and data sets developed to support hazard assessments and land use applications for Puget Lowlands. The geologic map and data sets for Vashon Island can be downloaded at the following website:

  http://geomapnw.ess.washington.edu/indes.php

RAPID RURAL RECONNAISANCE
RECOMMENDATION'S RANKING WORKSHEET

GENERAL INFORMATION

Recommendation ID:	
Recommendation Goals:	
Recommendation Objectives:	

RECOMMENDATION OVERALL SCORE
HIGH / MED / LOW

PLANNING LEVEL CRITERIA

Ecological Significance

SCORE: High / Med / Low

Ecological Processes/Indicators (Add additional attribute to this list if indices or processes are missing.)	**Improve** (Describe how or what ecological processes will be improved.)	**Protect** (Describe how or what ecological processes will be protected.)	**Scale** Reach/Site/Watershed
Hydrology			
Sediment Regime			
LWD Function			
Channel Function			
Floodplain Function			
Groundwater Recharge			
Water Quality			
Riparian Connectivity			
Fish Migration			
Anthropogenic Erosion			
Others			

Hazards To Life, Limb, And Property

SCORE: High / Med / Low

Hazard Type (List the hazard type, e.g. flooding, landslide, emergency access)	**Safety/Threat** (Describe who or what is at risk if no action is taken.)	**Urgency** (How quickly do we need to respond to this hazard to prevent a problem from growing worse and requiring an increasingly costly solution?)	**Responsibility** (Does the problem relate to a County facility that King County has a legal commitment to maintain? Hazards associated with County facilities should be a higher priority than sites where no such commitment exists.)	**Frequency** (Describe the frequency of the hazard.)	**Scale** Reach/Site/Watershed

Note: Priorities should be set in the following order: 1. Threats to public health and safety. 2. Damage to public infrastructure and developed public property. 3. Damage to private structures. 4. Damage to significant natural resources

Solution Efficacy -- Part A

List Recommended Action	**Identified Problems** (What problems the recommendation should be addressing.)	**Does the recommendation address the problem?**	**Does the recommendation address the problem source or treat a symptom?**	**Time frame for problem resolution (e.g. immediate, 1yr, etc.)**

Solution Efficacy-- Part B

SCORE: High / Med / Low

What is the longevity of the recommendation?	**Recommendation Readiness** (e.g. need further study, ready for feasibility, ready to build. Also, include what else is needed.)	**What are the benefits on a Geographic Scale? Site/Reach/Watershed**	**Cost**	

Figure 11-2. Sample Worksheet for Ranking Recommended Capital Improvement Projects

Table 11-2
Ranked Recommended Actions

Project VMI#	Rank	Project Name	Project Type	Estimated Cost
8	H	Grand Canyon on Shinglemill Creek	CIP	>$250K
12	H	Replace culvert at mouth of Ellisport Creek and remediate soils at Ellisport Creek	CIP	$1,167,000
14	H	Fish Barrier Removal	CIP	$276K/Yr
19	H	Natural Drainage Standards & Demo Project	Regulation	>$250K
37	H	East Fork Judd Erosion & Habitat degradation	CIP	>$75K
38	H	West Fork Judd Habitat Improvements	CIP	>$50K
32	H	Lower Shinglemill Habitat Improvements	CIP	>$250K
16	H	Groundwater Monitoring	Program	$1.5M/7Yrs
25	H	Riparian Habitat Restoration	Program	<$75
20	H	Bulkhead Assessment and Nearshore Habitat Restoration	Study	<$75
26	H	Islandwide Natural Resource Land Inventory	Study	<$75
7	H	Judd Creek Headwater Wetland Property Acquisition	Acquisition	$1.5M
10	H	Piner Point Acquisition	Acquisition	$250K-$450K
2A	M	Gorsuch Creek Debris Rack Installation	CIP	$50K
3	M	Water District 19 Diversion Structure Modification at Beal Creek, Ph 1	CIP	$60K
4	M	Wetland 4301 Protection and Enhancement, Phase 1	Study	$26K
5	M	Tahlequah Creek Habitat Improvements	CIP	$272K
9	M	Portage Salt Marsh Habitat Restoration	CIP	$1.03M
18	M	Fish Screens at Water Diversions	CIP	$34K/Yr
30	M	KVI Beach Conservation	Program	<$75
33	M	Septic System Improvement	Program	$75-$250K
15	M	Landslide / Drainage Study	Study	$59K
17	M	Establish Minimum In-Stream Flows	Study	$45K/Yr
29	M	Baseline Habitat Survey	Study	$75-$250K
11	M	Glacier Nearshore Conservation	Acquisition	$4-$8M
6	L	Mileta Creek Culvert Replacement	CIP	>$250K

* Projects 1-18 have detail project sheets in Appendix A

	Table 11-3 Unranked Actions	
Project VMI#	**Project Name**	**Project Type**
1	Raab's Creek and Estuary Restoration	Study
2B	Gorsuch Creek Abandoned Road Removal	CIP
13A	Upland pond & wetlands	Acquisition
13B	Aquifer Recharge Protection	Study
21	SW Band and 107th Flooding Reduction	CIP
22	Vashon Highway at Shawnee Hill Culvert Replacement	CIP
23	Water Quality Study	Study
27	Docton cross tiles	CIP
28	Canyon at Christensen Creek	Study
31	Kellogg Flooding	CIP
35	SW Bank and 103rd Flooding Reduction	CIP
36	Gorsuch Creek channel degradation and erosion	CIP
39	Education Program “Stewarding Your Land”	Program
NOTE: Priority ranking will be developed after gathering more data.		

* Projects 1-18 have detail project sheets in Appendix A

TABLE 11-1
RECOMMENDED ACTIONS

Project Number	Name	Problem Addressed: Category, Description and Source	Project Description	Justification/Benefit	Comments	Location	Estimated Cost*	Type of Project
VMI-01	Raab's Creek and Estuary Restoration	Salt marsh habitats in Central Puget Sound have been destroyed, filled and hardened. They are rare but these habitats are known to provide critical and diverse habitats for many species at many life stages. Nearshore Habitat—Estuary habitat destroyed by creation of dike / road bed at Raab's Creek. Dike no longer maintained. Deterioration and sedimentation will eventually fill in lagoon with loss of historical use as swimming hole and harbor, but may provide opportunity to restore salt marsh and nearshore habitat. (Source: King County Steward)	Restore salt marsh and nearshore habitat, (critical that feasibility phase of work include studies to assess impacts.) Project components would likely suggest actions from riparian planting to removal of debris and regrading.	Habitat restoration and connectivity (nearshore, salt marsh, and creek mouth)	Landowner is interested in working with the County on restoration after dike fails and lagoon silts in. Very far future. Permitting may be difficult.	Raab's Creek / Raab's Lagoon (2000 Thomas Bros. Guide p. 683-J1)	$75K for feasibility study	CIP/ Study
VMI-02A	Gorsuch Creek Debris Rack Installation	An historic roadbed and undersized and damaged culvert at the transition from open streambed to narrow ravine, and in an area of highly erosive soils, provide a risk of potential catastrophic debris flows downstream if the culvert gets clogged with debris and surface water flows erode the earthen fill. There is 700' of Class 2-S stream above this culvert and roadbed, which is a fish passage barrier. Gorsuch Creek receives significant storm water runoff from town, and has received periodic overflows from the KC wastewater treatment plant. KC WTD is making significant investment to improve wastewater treatment facilities to prevent further system overflows, and monitor water quality of stream. This stream is known to support cutthroat and is expected to provide viable habitat to other salmonids where accessible. The mouth of this stream flows out over geoduck beds that will be opened for commercial harvest with the improvement of the treatment plant. Potential road failure and catastrophic debris flows could result from high surface water flows combined with continued clogging of the culvert, resulting in both human health and safety issues for the homes at the mouth of the creek, and risks to the KC WTD and Roads infrastructure, but also WQ problems for the creek and related nearshore. Projects to address this problem would (1) prevent culvert blockage, (2) prevent or control erosion of road bed serving as an earthen dam, (3) control or reduce flashy stormwater flows in this stream, and (4) repair damaged stream banks	Place debris rack at upstream entrance of culvert and stabilize the outlet. Restore damaged riparian area	Address potential danger to health and safety of downstream residents and to downstream habitat if culvert gets plugged; stabilize erosion, and improve water quality	Vashon Town Center stormwater study indicates flows in Gorsuch Creek are double predevelopment conditions. Regional detention or other technology that emulates natural drainage regimes may be necessary for erosional stability	Gorsuch Creek (2000 Thomas Bros. Guide p. 653-G5)	$50K	CIP
VMI-02B	Gorsuch Creek Abandoned Road Removal	Habitat/Erosion—Culvert under a historical roadbed in Gorsuch Creek susceptible to clogging and potential failure and is a fish passage barrier due to being perched and having a high slope. The channel above and below the culvert has been incised. Turbid water present during reconnaissance. (Source: King County Steward)	Remove historic road and culvert, restore riparian habitat	Habitat restoration, habitat connectivity, stabilize erosion, may prevent catastrophic failure if culvert were plugged	Vashon Town Center stormwater study indicates flows in Gorsuch Creek are double predevelopment conditions. Regional detention or other technology that emulates natural drainage regimes may be necessary for erosion stability	Gorsuch Creek (2000 Thomas Bros. Guide p. 653-G5)	$629K	CIP
VMI-03	Water District 19 Diversion Structure Modifications at Beall Creek, Phase 1	Habitat—Water District 19 diversion structure for surface water withdrawal of Beall Creek is a fish passage barrier to 3200 feet of class 2s stream, primarily in Water District 19 ownership. The water withdrawal system is also over 30 years old and is in danger of collapse. Current maintenance needs and system conditions require some repair work to be done sooner than later. Water District 19 would like to work in partnership with KCWLRD on a project that will make their operations safer for fish and better for the watershed. An ideal system would accommodate both water withdrawal and spawning and rearing habitat. (Source: King County Steward)	Rehabilitate or replace diversion structure to provide water withdrawal that allows fish passage. Phase 1 of project includes development of two to three options along with a feasibility analysis and project scheduling.	Habitat accessibility and restoration	The access that appears to be County right of way is narrow; this could be a joint project with Water District 19, potential grant funds from DOE.	SE1/4 S29 T23N R3E, 8611 Soper Road (2000 Thomas Bros. Guide p. 653-H6)	$60K	CIP
VMI-04	Wetland 4301 Protection and Enhancement, Phase 1	Habitat/Drainage—Wetlands in upper Shinglemill Creek have been degraded because of increased surface water inflows causing greater wetland water level fluctuation. Concern for potential degradation to Shinglemill system. (Source: King County Steward)	Work with upstream landowners to understand localized hydrologic regime and restore balance; conduct an engineering study to delineate drainage area of wetland and evaluate alternatives to manage offsite runoff.	Habitat protection and potential restoration	Potential threat to stream and potential for drainage problem similar to Grand Canyon.	Shinglemill Creek Headwaters (2000 Thomas Bros. Guide p. 653-E5)	$26K	Study
VMI-05	Tahlequah Creek Habitat Improvements	Habitat—Tahlequah Creek downstream from SW Pohl Road flows through narrow anthropogenic concrete channel. Instream and riparian habitat is degraded. Fish passage may be compromised. No cover provided in channel or adjacent to stream. Condition of channel is poor. Coho and cutthroat trout are expected in this stream system. Chum salmon may have used stream pre-development (Sources: WRIA 9 Report, Stream Typing Survey, Habitat Analysis)	Work with landowners, conduct a study to determine hydraulics of anthropogenic alterations, evaluate opportunities to enhance instream and riparian habitat and improve fish passage; develop joint projects to enhance habitat and restore connectivity, remove flume and restore more natural channel	Habitat restoration and connectivity, fish passage	Removal of concrete flume is a County policy. Landowners were contacted by Lorin Reinelt. Steward will contact again to inform them that this project might be in the report.	13417 SW Pohl Road (2000 Thomas Bros. Guide p. 743-A1)	$272K	CIP
VMI-06	Mileta Creek Fish Passage Project	Habitat—County culvert (ESA E1226) on #45 Mileta Creek at Dockton Road SW. 5.5-foot drop and apron constitute barrier. (Source: Stream Typing Survey)	Provide construction options and costs for fish passage up to and through box culvert and add LWD to stream in culvert vicinity.	Habitat connectivity	3'x3' concrete culvert about 40' down from Dockton Road (guardrails)	Mileta Creek (2000 Thomas Bros. Guide p. 713-J1)	$250K	CIP
VMI-07	Judd Creek Headwater Wetland Property Acquisition	Healthy headwater wetlands and riparian forests are important to watershed function. These parcels were in private ownership, and put on the market for private development. It is important to preserve the wetlands and their surrounding forests. Habitat/Groundwater—Shallow groundwater is highly susceptible to contamination from surface pollution sources and open wetland complexes are the headwaters for Judd Creek, but properties are at risk for subdivision and development. (Source: King County Steward)	Acquire 83.15 acres of property	Protect habitat supporting functions of Judd Creek (groundwater inflow, regulate instream flows, wetland function, etc) Provide continuity of protected open space. Additionally, these wetlands and surrounding forests are known to be over outwash soils. It is expected that groundwater recharge may benefit simply by wetland and forest duff "sponge"-like functions holding water and allowing it to perk through deeper less permeable layers to the aquifer.	KC and partners currently working with land owners	Between Cemetery and Bank Roads (2000 Thomas Bros. Guide p. 653-E7)	Total cost of approx. $1.5 M Approx. ½ already raised.	Acquisition
VMI-08	Grand Canyon on Shinglemill Creek	Erosion/Habitat/Drainage—"Severe" erosion of portion of Shinglemill Creek near RM 0.8 due to anthropogenic drainage alterations. (Sources: King County Steward, King County Roads Maintenance, Stream Typing Survey) Problem is two fold: (1) redirected water from natural course will continue to cause erosion, (2) ongoing erosion has potential to further degrade stream system.	Correct drainage diversion to prevent further problem and reduce further erosion/sediment loading in stream. Multiple possibilities: (1a) Redirect diverted water flow to original drainage, using methods that emulate natural drainage while preventing additional problems. (1b) Redirect drainage via tightline drainage alongside the canyon; (2a) add wattels to trap sediment and prevent downstream transport or (2b) add LWD downstream to potentially manage sediment flows through floodplain and create more diversity of stream structure. 2b should not be undertaken as part of this project without a full watershed scale geomorph /hydrologic study.	Correct drainage problem and reduce sediment load and flow, benefits habitat	Include sediment budget, habitat analysis; determine if a limiting factor for salmonid populations; address drainage issue, then focus on erosion	Shinglemill Creek RM 0.8 (2000 Thomas Bros. Guide p. 653-E3)	>$250K	CIP

TABLE 11-1
RECOMMENDED ACTIONS

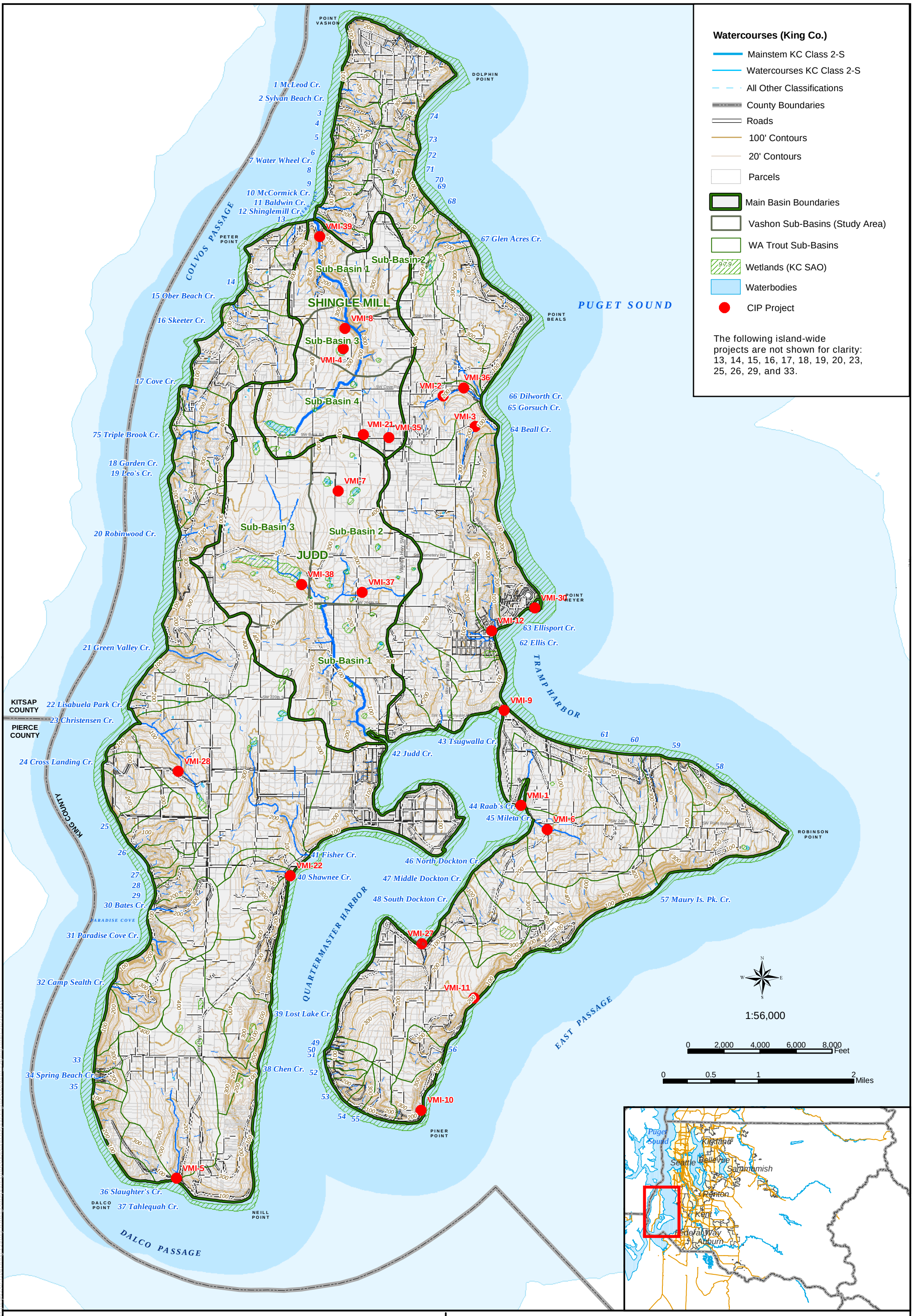
Project Number	Name	Problem Addressed: Category, Description and Source	Project Description	Justification/Benefit	Comments	Location	Estimated Cost*	Type of Project
VMI-9	Portage Salt Marsh Restoration	Nearshore Habitat—Isthmus between Vashon & Maury islands historically a salt marsh with some tidal influence between Tramp and Quartermaster. Development, especially fill and road development has changed hydrologic regime and is degrading salt marsh by inundating with fresh water. Culverts to wetland undersized and get blocked with debris regularly, causing wetland to flood adjacent private properties, subsequently causing septic failures. This project would restore a rare and valuable habitat type while resolving a drainage and flooding problem. (Sources: King County Steward, King County Roads Maintenance)	Working from 1998 scoping document, utilitize nearshore experts to conduct feasibility study of scoped or new alternatives. Then implement project to improve tidal exchange, protect and enhance salt marsh plant species, remove added or accumulated fill as appropriate. Work with adjacent land owner, particularly to south, to resolve flooding and related septic failure.	Salt marsh restoration; habitat restoration	Tidal geomorphologic study will be needed in order to determine the viability of this project particularly with identification of a self-maintaining replacement culverts.	Between Portage and Quartermaster Roads (2000 Thomas Bros. Guide p. 653-H5)	$1.03M	CIP
VMI-10	Piner Point Acquisition	Nearshore Habitat—Preservation of pristine nearshore habitat (Source: King County Steward)	Work with willing and motivated seller to permanently protect high quality shoreline habitat, and critical habitat forming processes.	Habitat preservation	County worked with Trust for Public Lands in initial negotiations. Failure to secure desired funding prevented a purchase option agreement.	Piner Point (2000 Thomas Bros. Guide p. 714-F7)	$450K	Acquisition
VMI-11	Glacier Nearshore Conservation	Nearshore Habitat—Development of gravel mine on Maury Island may degrade nearshore habitat. Source: King County Steward	Permanently protect approximately 1 mile of functional marine riparian buffer adjacent to gravel mine, specific area to be determined by geomorphological attributes. Consider conservation easement, partial interest or fee title acquisition.	Habitat conservation	Challenges include cost, landowner willingness, and compatibility of conservation and adjacent zoned land use	Maury Island south of Gold Beach (2000 Thomas Bros. Guide p. 713-H4)	$4-$8M	Acquisition
VMI-12	Replace Culverts At Mouth Of Ellisport Creek And Remediate Soils At Ellisport Creek	Nearshore Habitat/ Water Quality—Historical estuarine wetlands have been degraded by road and fill development. Ellisport Creek is constrained in twin culverts under Dockton Road SW that impact the saltwater regime for a stream mouth that would have likely seasonally meandered across a sandy gravelly beach. Seasonal shoreline deposition buries culverts in winter, and could present a fish passage barrier during spawning season, though fish utilization is unknown (stream is expected to be able to support cutthroat and coho). In addition, historic land use activities contaminated soils above the culverts with Bunker C oil, which will need to be remediated or removed prior to restoration. (Source: King County Steward, King County Roads Maintenance, Stream Typing Survey)	Remediate or remove soils. Replace culverts with box culvert or bridge to restore dynamic nearshore and creek mouth connection. Regrade as appropriate to create self-maintaining system, and restore salt tolerant riparian plant communities. A successful project will utilize nearshore expertise to conduct a tidal geomorphological analysis and reference site study.	Habitat restoration (nearshore, salt marsh, and creek mouth) of rare habitat type. MTCA site cleanup will protect and improve aquatic habitat and water quality.	KC Roads wants to replace culverts, but has been delayed by contaminated soils upstream from mouth, and has delay project until remediated, (County roads project 3-1645)	Ellisport Creek & Chautauquah Beach Road (2000 Thomas Bros. Guide p. 683-H3)	$1,167,000	CIP
VMI-13A	Upland Ponds & Wetlands	Habitat/Groundwater—Shallow groundwater is highly susceptible to contamination from surface pollution sources (Source: Groundwater Characterization)	Create/continue program to acquire and preserve land containing upland ponds and wetlands in recessional and ice-contact deposits	Protection of Vashon-Maury Island as a sole source aquifer	Identify sites additional to those currently pursued considered, similar goals with Vashon-Maury Island Land Trust; coordinate efforts?	25 ponds and 30 wetlands identified in island-wide recessional and ice-contact deposits	$205K/yr	Acquisition
VMI-13B	Aquifer Recharge Protection	Habitat/Groundwater—Shallow groundwater is highly susceptible to contamination from surface pollution sources (Source: Groundwater Characterization)	Protect aquifer recharge areas that may be susceptible to contamination from surface water	Protection of Vashon-Maury Island as a sole source aquifer	Conduct study to determine surface water areas of impact on aquifer recharge areas; identify sites in addition to those currently being pursued, considering similar goals with Vashon-Maury Island Land Trust; coordinate efforts?	25 ponds and 30 wetlands identified in island-wide recessional and ice-contact deposits	$205K/yr	Study
VMI-14	Fish Barrier Removal	Habitat—Washington Trout (2001) completed a comprehensive survey of fish passage barriers on Vashon-Maury Island. Numerous culverts, diversion structures and bulkheads are passage barriers and should be repaired. (Source: Stream Typing Survey)	Assess culvert passage problems on creeks not identified as specific projects in this report. Programmatically replace or repair problems.	Habitat connectivity and restoration for overwintering juvenile fish and anadromous salmonids. Improving fish passage is critical to increasing the potential salmonid production on the Island.	Stream Typing Survey is most comprehensive and current, 49 known barriers, 17 possible barriers, and 5 unknown. Some individual culverts are listed as specific projects on larger creek systems, some culverts may have already been replaced, and others could be replaced within road right of way by County Roads Maintenance or off-road right of way under the Neighborhood Drainage Assistance Program or Small Habitat Restoration Program.	See Stream Typing Survey report	$276K/yr	Program?
VMI-15	Landslide /Drainage Study	Landslide/Drainage/Erosion—Various landslide areas were identified to cause problems with County roads and drainage (Source: King County Roads Maintenance); Majority of landslides on Island are caused by poor drainage activities upgradient of steep slopes or ravines that are landslide hazards	Study landslide areas, assess causes, risks, and potential solutions that balance protection of health and safety with ecological benefit of natural erosion	Catastrophic landslide events have occurred on the island in various locations due to natural and anthropogenic causes	Many substandard private access routes with landslide, drainage, and spring problems. County Roads provides services when life or limb are threatened	Island-wide, 6 location chosen for pilot project	$59K/yr	Study
VMI-16	Groundwater Monitoring	Groundwater—Current available groundwater level measurements not sufficient to identify significant changes or trends. (Source: Groundwater Characterization)	A long-term plan that evaluates the quantity and quality of the Vashon-Maury Island groundwater is being proposed to address needs and concerns identified by residents of Vashon-Maury Island and King County staff. The work plan for the Vashon-Maury Island source water evaluation has four main objectives: 1. To monitor Vashon-Maury Island groundwater and surface water quantity and quality to allow for the identification of changes over time; 2. To build a comprehensive groundwater flow model that evaluates groundwater and surface water quantity and quality under various climate change and land-use scenarios; 3. To satisfy the goals of the countywide data management work plan for the Vashon-Maury Island region; and 4. To coordinate activities with the Vashon-Maury Island Groundwater Protection and Land Use Committees, the WRIA 15 watershed planning unit, and the citizens of Vashon Maury Island. This scope of work is intended to last for the next 7 years. After 7 years, the work plan will be reevaluated and recommendations will be made.	Protect Vashon-Maury Island sole source aquifer. The data will be used to inform future surface water management actions.	Data will help define gaining and loosing stream reaches, assisting in further water balance calculations.	Island-wide	$1.5 Mil over 7 years.	Study

TABLE 11-1
RECOMMENDED ACTIONS

Project Number	Name	Problem Addressed: Category, Description and Source	Project Description	Justification/Benefit	Comments	Location	Estimated Cost*	Type of Project
VMI-17	Establish Minimum In-stream Flows	Groundwater/Habitat/In-Stream Flows—Minimum in-stream flows have not been established for systems where surface and aquifer withdrawals occur. (Sources: WRIA 9 Report, Habitat Analysis, Groundwater Characterization)	Investigate surface and groundwater withdrawals, in-stream flows, and effects on salmonids	Management of withdrawals based on habitat needs of stream system	We need to know where groundwater is a critical factor	Significant streams with significant surface, groundwater withdrawals possible streams include Ellis, Beall, Fisher, and Shinglemill	$45K/yr	Study
VMI-18	Fish Screens At Water Diversions	Habitat—Numerous water diversions on the island do not have fish screens. (Source: Stream Typing Survey)	Install fish screens at diversions	Protect fish populations	Separate each opportunity and individually pursue with landowner	20 possible sites identified	$34K/yr	CIP
VMI-19	Natural Drainage Standards, Low Impact Development (LID), & Demo Projects	Habitat/Water Quality/Groundwater—Reducing effective impervious surfaces that contribute to degraded surface and groundwater quantity and quality is an Islandwide issue due to the Island's critical natural resource status as a sole source aquifer. New and redevelopment opportunities should implement LID standards to reduce environmental problems of water quality and quantity.	Support LID/natural drainage standards for all construction projects, including road drainage standards to promote pervious surfaces, improve water quantity and quality, and to reduce facility construction and maintenance costs.Examples include maximizing native vegetation and minimizing impervious surface, narrower roads, using pervious materials such as pervious concrete f, green roofs for buildings, promoting bioretention and infiltration. Implement LID/natural drainage projects specifically in Vashon Town Center and Islandwide as opportunities warrant. Identify and evaluate specific project sites and provide conceptualdesigns.	Allows for natural infiltration and runoff mechanisms to function reducing impacts to surface and groundwater natural infrastructure and supply. LID and natural drainage standards can cost less to implement and to maintain than current drainage standards and also help meet environmental goals. Cost comparisons can vary depending on new development vs retrofit and on site conditions	Deals primarily with future development or redevelopment and some Vashon-Maury Island aesthetic with existing stormwater facilities.	Island-wide	>$250,000	Policy
VMI-20	Bulkhead Assessment Nearshore Habitat Restoration	—King County has approximately 100 miles of marine shoreline. Historically, shorelines have been altered, filled, bulkheaded, riparian zones cleared for views. Bulkheads have often been installed where there is a perceived risk to private property. Many bulkheads are actually unnecessary for a range of reasons: While tidal energy can be one source of erosion, gravity, geology, surface water, and stormwater are other equally significant causes. This hardening and constraint has limited (if not eliminated) much of the habitat and habitat forming processes in the nearshore. These nearshore habitats are critical to salmonids, particularly in providing food and refuge to juveniles. Vashon and Maury Island encompass 50% of King County's entire marine shoreline. Initial survey's have indicated approximately 50% of the islands' shore has been bulkheaded, which is significantly less than the mainland where more than 90% of the shoreline has been hardened. In the interest of protecting and even improving available habitat and functional habitat forming processes, the shoreline of Vashon and Maury Island should be assessed to determine where bulkhead removal could be successful at restoring critical shoreline processes or augmenting/protecting healthy reaches of shoreline. (Source: King County Steward)	Analyze available data regarding existing conditions of Vashon's nearshore. Create model(s) for assessing and evaluating opportunities to remove bullkheads (or other structures) where critical habitat could be gained or reaches of habitat could benefit. Identification and prioritization methods should include opportunities on both private and public properties, consider site benefits and reach or littoral drift cell benefits, should look for opportunities to demonstrate both bulkhead removal and alternative shoreline protection methods where appropriate, and should consider input from a multidisciplinary nearshore team. Identify at least one feasible pilot project and develop cost estimates.	Protect and enhance Habitat and habitat forming processes	Coordinate efforts with WRIA 9 inventory processes Existing data and efforts that should be considered include 2001 Washington Trout Bulkhead (stream mouth) survey, the Rapid Shoreline inventory, WDNR Shorezone database, aerial /ortho photographs, among others.	See Stream Typing Survey report	<$75K	CIP
VMI-21	SW Bank and 107th Flooding Reduction	Flooding—Flooding occurs along SW Bank Road near 107th Ave NW because the road is too low through a natural depression. (Source: King County Roads Maintenance)	Raise road grade	Reduce flooding potential	Not a drainage capacity problem, wetland located on edge of high groundwater recharge/susceptibility area; redirecting high flows to wetland is not recommended. This site not field verified.	SW Bank Rd & 107th (2000 Thomas Bros. Guide p. 653-E6)	>$250K	CIP
VMI-22	Vashon Highway at Shawnee Hill Culvert Replacement	Flooding—Culvert has plugged in past causing flooding (Source: King County Roads Maintenance)	Replace undersized culvert	Reduce flooding potential	This area is an eroding slope and sediment debris plugs the culvert. Road maintenance issue.	Shawnee Hill Road (2000 Thomas Bros. Guide p. 713-E1)	<$75K	CIP
VMI-23	Water Qality Study	Water Quality—Limited water quality data exist for Vashon-Maury Island streams. (Sources: WRIA 9 Report, Water Quality Analysis)	Collect water quality data for island streams, especially those with significant development in the watershed	Habitat characterization and possible restoration	Review industrial NPDES permits, especially dairies for compliance	Various Streams	$75K-$250K	Study
VMI-25	Riparian Habitat Restoration	Habitat—Land use practices on the island have degraded riparian habitat	Work with landowners to improve riparian habitat through a variety of actions including: planting native shrubs & trees, to implement agricultural BMPs, and to exclude livestock grazing in riparian corridor	Improved habitat for riparian dependant species, improved water quality,	This is a voluntary program so Property owner willingness is essential	Island-wide, but especially agricultural land in headwaters and in riparian zones	<$75K	Program
VMI-26	Islandwide Natural Resource Land Inventory	Habitat/Erosion—There is a need for a comprehensive inventory of all natural resource lands for all preservation and restoration efforts on the Island. The 1981 Vashon Community Plan, WRIA9 salmon recovery plan, and various King County programs like farming and forestry all have or are in the process of identifying high quality resource lands. All of these efforts should be combined for VMI to help set priorities and coordinate efforts and funding to maximum benefit relating to EIA. Stream channels are likely unstable and will be impacted in future. Prevent deforestation and encourage reforestation (Source: Geomorphology Analysis)	Develop an Islandwide analysis of natural resource lands for a coordinated approach to Preservation & Restoration efforts. Utilize existing studies and GIS as primary sources of information.	Identification of priority natural resource habitats for preservation and restoration programs. This will provide benefits to surface and groundwater quantity & quality, benefit priority species, shoreline and nearshore habitat resources, and identify farm and forestry resources.	An ecosystem approach natural resource management and sustainable living	All of Vashon/Maury Island and surrounding waters.	<$75	Program/Acquisition
VMI-27	Dockton Cross Tiles	Erosion—Deteriorating Dockton Road SW cross tiles / catch basins. Bulkhead is failing.	Replace deteriorating cross tiles and catch basins. Repair or remove the bulkhead.	Prevent increased erosion, failure of road bed	Needs further reconnaissance	Tramp Harbor (2000 Thomas Bros. Guide p. 683-H4)	$75K-$250K	CIP
VMI-28	Canyon at Christensen Creek	Erosion—"Severe" erosion of area near Christensen Creek. Future potential threat to SW Reddings Road. (Source: King County Roads Maintenance)	Study geomorphology of canyon and determine impact on Christensen Creek and SW Reddings Road	Determine whether canyon is result of anthropomorphic development or natural occurrence, determine impacts of erosion on stream system	Needs further reconnaissance	Near SW Reddings Road (2000 Thomas Bros. Guide p. 653-B6)	<$75K	CIP/Study

TABLE 11-1
RECOMMENDED ACTIONS

Project Number	Name	Problem Addressed: Category, Description and Source	Project Description	Justification/Benefit	Comments	Location	Estimated Cost*	Type of Project
VMI-29	Baseline Stream-Habitat Survey	Stream Habitat Information Data Gap—No baseline stream-habitat survey information exists for Vashon-Maury Island systems. (Sources: WRIA 9 Report, Habitat Analysis)	Conduct stream-habitat surveys, starting with the larger watersheds to develop an inventory of baseline data	Create baseline stream-habitat information that allows evaluation of past, current and future conditions. Assess stream conditions to prioritize actions that protect significant resource areas and identify solutions to address stream habitat degradation problems.	Conduct stream-habitat surveys based on watershed size.	Significant salmonid-bearing streams on Vashon Island.	$75K-$250K	Study
VMI-30	KVI Beach Conservation	Habitat—Recreational use of property could degrade salt marsh habitat. (Source: King County Steward)	Work with Fisher Broadcasting to develop a program of property management to protect the salt marsh, by considering property enhancements like interpretive signage and site path improvements.	Habitat conservation and public education.	Pristine salt marsh	Point Heyer (2000 Thomas Bros. Guide p. 683-J3)	<$75K	CIP
VMI-31	Kellogg Flooding	Flooding—Increased flows through swale cause ponding and basement flooding on Kellogg Property. (Source: Drainage Complaints)	Replace drain from depressed area in Kellogg yard	Reduce flooding potential, private property flooding problem.	See RRR Field Study, 9/01 Check to see if this has already been done - stormwater services	20605 111th Ave SW (2000 Thomas Bros. Guide p. 683-E3)	<$92K	CIP
VMI-32	Lower Shinglemill Habitat Improvements	Instream habitat is degraded by a large amount of sediment moving through the stream system reducing instream habitat complexity. Riffle habitat dominates.	Improve the instream complexity and diversity of habitat types. Determine role, need, and placement of LWD in lower Shinglemill Creek. Determine likelihood of success for different alternatives to improve instream habitat.	Instream spawning and rearing habitat for salmonids is severely limited in lower Shinglemill creek due to large amounts of sediment reducing instream habitat diversity and complexity. The project would increase the spawning and rearing success for salmonids in this long reach of stream.	Further assessment of what solution is feasible to fix the problem. This project is dependant on success of Project VMI#8.	Lower mile of Shinglemill Creek.	>$75K	CIP
VMI-33	Septic System Improvements	Water Quality—Failing septic systems may contaminate groundwater, surface water and nearshore environments. (Source: VMIGPC)	Develop program that would identify and implement solutions for septic system failures on surface water, groundwater, and nearshore environments. Educational opportunities and facilitate working with Dept. of Health. Solution is to do septic system retrofit and upgrades. E.g., Revolving fund for septic upgrades	Water quality protection, groundwater protection, nearshore wildlife habitat health, shellfish and nearshore recreation benefit.	Work with Public Health; determine what role we would play two problems 1. Retrofit septic systems 2. Maintenance of septic systems	Island wide, but focusing on nearshore environments with chronic shellfish contamination	$75K-250K	Program
VMI-35	SW Bank and 103rd Flooding Reduction	Flooding/Water Quality—Private culverts at the shopping center on SW Bank Road near 103rd Avenue SW are undersized and cause flooding. No oil/water separator exists for the parking area – the drainage flows through lands used to graze cows. (Source: King County Roads Maintenance) There are three issues here that need to be resolved. 1. Flooding - nature of flooding problem is undetermined now. 2. Water Quality is also undetermined, needs investigation. 3. Erosion, sedimentation.	Increase culvert size, install structural BMP Install spill control. Need to include other types of recommendation to improve/address water quality. Bioswale, filtration, catch basin inserts, storm vault detention and filtration. actions to consider to address erosion biostablization, LWD.	Reduce flooding potential, improve water quality	Comment: This description needs to be clarified and verified. Not clear exactly which culvert this is. 1. Determine where culvert is located. 2. Determine if this is a water quality problem.	SW Bank Rd & 103rd (2000 Thomas Bros. Guide p. 653-F6)	$75K-250K	CIP
VMI-36	Gorsuch Creek Channel Degradation And Erosion	Down cutting and erosion along several reaches of Gorsuch Creek- due to heavy stormwater flows.	Try to stabilize portion of Gorsuch and prevent further degradation. Further analysis of this drainage is needed to determine appropriate action.	Improve highly degraded habitat. Improve water quality, minimize erosion.	Gorsuch Creek highly impacted compared to other streams on the island. Impacted by surface water run off and water treatment plant, outfall. Subject to future habitat analysis finding. Not enough information now to rank.	Gorsuch Creek	$75K-250K	CIP
VMI-37	East fork Judd Creek Erosion & Habitat Degradation	Stream bank & bed erosion, down stream of wetland 2825A	Identify source of erosion, reduce erosion rates, & improve instream habitat.	Impacts salmon spawning and rearing in immediate reach and downstream major spawning areas in mainstem Judd Creek. Direct benefits to surface water quantity, quality, aquatic habitat, lower erosion rates reducing impacts to private and public property. Indirect benefits to groundwater supply and quality. Prevent increased erosion.	Basin boundary needs to be verified. More detailed information is needed to determine adequate score. Habitat degradation mapped on Habitat map in RRR.	Downstream of country store.	$75K-250K	CIP
VMI-38	West Fork Judd Creek Habitat Improvement	Highly degraded instream and riparian habitat identified in RRR between Cemetery Rd and 115th Ave SW.	Further identify degraded instream, riparian, and wetland habitat and develop habitat improvement applications with various property owners.	Improves on site habitat and water quality providing water quality benefits to the important downstream spawning and rearing reaches of Judd Creek.	Property owner(s) participation is key to project success. Further data on instream and riparian conditions need to assess project needs and costs.	West Fork of Judd Creek from just north of SW Cemetery Rd to 15 Ave SW.	$50K	Study/CIP
VMI-39	Educational Program: "Stewarding Your Land"	Risk to groundwater pollution from nitrates, pesticides, and fertilizers; continued degradation and loss of the island's nearshore habitat; loss of native plants and natural indigenous wildlife; runoff and erosion problems on the island.	Offer class on four or more subjects including Native Plants/Invasive Pants, Water/Storm Water Control, Septic Systems, and in Alternatives to Toxic.	Educational programs will help local residents better understand the environmental impacts that they can impact and choose to make better ecological choices to help protect and preserve existing natural resources.		Islandwide	$20,000 per year.	Program



King County
Department of Natural Resources and Parks
Water and Land Resources Division

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Source: King County GIS, 2002; WDNR: WA Trout, 2002; WA Trout stream types 2 and 3 (WAS 222-16-031) shown as King County Class 2 with salmonids (KCC 21A.06.1240).

VASHON ISLAND - CAPITAL IMPROVEMENT PROJECTS

KING COUNTY RAPID RURAL RECONNAISSANCE

Figure 11-1

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